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Environmental Protection
Agency

Prevention, Pesticides
and Toxic Substances
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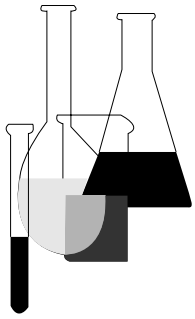
Product Properties Test Guidelines

OPPTS 830.7300 Density/Relative Density/Bulk Density



INTRODUCTION

This guideline is one of a series of test guidelines that have been developed by the Office of Prevention, Pesticides and Toxic Substances, United States Environmental Protection Agency for use in the testing of pesticides and toxic substances, and the development of test data that must be submitted to the Agency for review under Federal regulations.

The Office of Prevention, Pesticides and Toxic Substances (OPPTS) has developed this guideline through a process of harmonization that blended the testing guidance and requirements that existed in the Office of Pollution Prevention and Toxics (OPPT) and appeared in Title 40, Chapter I, Subchapter R of the Code of Federal Regulations (CFR), the Office of Pesticide Programs (OPP) which appeared in publications of the National Technical Information Service (NTIS) and the guidelines published by the Organization for Economic Cooperation and Development (OECD).

The purpose of harmonizing these guidelines into a single set of OPPTS guidelines is to minimize variations among the testing procedures that must be performed to meet the data requirements of the U. S. Environmental Protection Agency under the Toxic Substances Control Act (15 U.S.C. 2601) and the Federal Insecticide, Fungicide and Rodenticide Act (7 U.S.C. 136, *et seq.*).

Final Guideline Release: This guideline is available from the U.S. Government Printing Office, Washington, DC 20402 on disks or paper copies: call (202) 512–0132. This guideline is also available electronically in PDF (portable document format) from EPA's World Wide Web site (http://www.epa.gov/opptsfrs/home/guidelin.htm) under the heading ''Information Sources/Test Methods and Models/OPPTS Harmonized Test Guidelines.''

OPPTS 830.7300 Density/relative density/bulk density.

(a) **Scope**—(1) **Applicability.** This guideline is intended to meet testing requirements of both the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. 136, *et seq.*) and the Toxic Substances Control Act (TSCA) (15 U.S.C. 2601).

(2) **Background.** The source materials used in developing this harmonized OPPTS test guideline are the OPPT guideline under 40 CFR 796.1150 Density/relative density, OPP guideline 63–7 Density, bulk density, or specific gravity (Pesticide Assessment Guidelines, Subdivision D: Product Chemistry, EPA Report 540/9–82–018, October 1982) and OECD guideline 109 Density of Liquids and Solids.

(b) **Introduction.** This test guideline references methodology to develop data on density, relative density (specific gravity), and bulk density of chemical substances and mixtures. The data may be used to evaluate the manner and extent that chemicals will be transported in the environment and the places they will be deposited.

(c) **Test procedures.** Examples of methods for determining density and relative density of gaseous, liquid, or solid chemical substances are listed in Table I, ‘‘Standard Density - Measurement Techniques Referenced in this Guideline’’ and in OECD Guideline No. 109 (OECD 1995), ‘‘Density of Liquids and Solids.’’ Bulk density may be determined by using methods outlined in ASTM D–729 or CIPAC MT 159. If bulk density cannot be accomplished due to the nature of the solid, conduct relative density studies using a standard method such as CIPAC MT–3. The codes to standardizing bodies listed in table I are:

ANSI—American National Standards Institute; ASTM—American Society for Testing and Materials; BSI—British Standards Institution; IP—Institute of Petroleum; CIPAC—Collaborative International Pesticides Analytical Council; DIN—Das Ist Norm (earlier Deutsche Industrienormen); API—American Petroleum Institute; ISO—International Organization for Standardization; OECD—Organization for Economic Cooperative and Development.

These standards are available for purchase as follows:

(1) ANSI, BSI, ISO, and DIN standards are available from: Sales Department, American National Standards Institute, 1430 Broadway, New York, NY 10018.

(2) ASTM standards are available from: American Society for Testing and Materials, 1916 Race St., Philadelphia PA 19103.

(3) API methods are available from: American Petroleum Institute, 2101 L Street, NW., Washington, DC 20037.

(4) IP methods are available from: Hayden and Son Ltd., Spectrum House, Alderton Cres., London NW4 3XX U.K.

(5) CIPAC methods are available from: National Agricultural Chemicals Association, 1155 Fifteenth Street, NW., Washington, DC 20005.

(6) OECD methods are available from: OECD Publications and Information Center, suite 1205, 2750 Pennsylvania Ave., NW., Washington, DC 20006.

Table 1.—Standard Density-Measurement Techniques Referenced in this Guideline

	Class of Substance			Standardizing Body and Identification Number						
Technique	Gas	Liq.	Solid	ANSI	ASTM	BSI	CIPAC	DIN	ISO	OECD
Ideal gas calculation	X									
Gas density balance	X			277.12	D 1070 (26)[1]					
Hydrometer		X		Z11.84 Z11.147 D 891	D 1298 (23,40)[2] D 1657 (23) D 891 (29)	4714	MT3	51757 12791 ·2, 3	R387 R649	
Hydrostatic displacement		X	chunks	K65.8 C 830 D 891	D 792 (35) C 830 (17) D 891 (29) C 693 (17)			53479	R1183	
Sink-float coparator			chunks	C 729	C 729 (17)					
Pycnometer-narrow-mouth. Sprengel-Ostwald		X								
Lipkin bicapillary		X		Z11.62 Z11.120 D 3505	D 941 (23)[3] D 1481 (23, 40) D 3505 (29)	4699	MT3			
Bingham		X		D 891 D 1217 Z11.119	D891 (2) D1217 (23) D 1480 (23)			12807		
Pycnometer-wide-mouth. volumetric flask		X	powder crystals chunks	D 153 10768	D 153 (28) D 1076 (37)					
thermometer stoppered		X	powder crystals chunks	C 135 K65.8	C 135 (17) D 792 (35)					
capillary stoppered		X	powder crystals chunks	D1076 D 153 D 1817 K65.8 D 891	D 1076 (37) D 153 (28) D 1817 (37) D 792 (35) D 891 (29)	5093	MT3	12797 12809		
Johnson and Adams		X	powder crystals chunks							
Gas comparison pycnometer			powder	C 604	C 604 (17)					
Oscillating densitimeter		X								109

[1] In parentheses by ASTM Test Standard number is the volume number in which the standard appeared in the 1978 Annual Book of ASTM Standards.

[2] Adopted by American Petroleum Institute as API Standard No. 2547 and by the Institute of Petroleum as IP Standard No. 160.

[3] Adopted by the General Services Administration as Method 402, Federal Test Method Standard 791b.

(d) **References.** The following references should be consulted for additional background material on this test guideline.

(1) ANSI. American National Standards Institute. Book of Standards (latest edition).

(2) ASTM. American Society for Testing and Materials. Annual Book of ASTM Standards (latest edition).

(3) API. American Petroleum Institute. Book of Test Standards (latest edition).

(4) BSI. British Standards Institution. Book of Standards (latest edition).

(5) CIPAC. Collaborative International Pesticides Analytical Council. Handbook, vol. I. Analysis of Technical and Formulated Pesticides.

(6) DIN. Das Ist Norm. Book of Standards (latest edition).

(7) IP. Institute of Petroleum. Book of Standards (latest edition).

(8) ISO. International Organization for Standards. Book of Standards (latest edition).

(9) *Organization for Economic Cooperation and Development*, Guidelines for The Testing of Chemicals, OECD 109, Density of Liquids and Solids, OECD, Paris, France.